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universe and, suspending our judgment, assume an agnostic position. But the human mind, even when rigidly scientific and logical, is so constituted that few of us are satisfied to stop here. He who is most capable of daring speculation in the realm of physical or biological or philosophic thought cannot refrain from inquiring into the nature of the first or moving cause, and how the present order of things has been brought about.

As a mere working hypothesis, we are, at least many of us, compelled to assume that the present order of things, material and immaterial, is not self-evolved, but is the result of an Infinite Intelligence and Will giving the initial impulse and dominating as well as guiding and coordinating the progressive changes, whether cosmical, geological or biological. The fact of the survival of the fittest, of the extinction of the unfit, the conclusion that throughout the universe order has arisen from chaos or the undifferentiated, the specialized from the generalized, that the good and beautiful and true have in the past overcome and will continue to outweigh what is unfit and evil in matter, mind and morals, at least strongly suggests that the First Cause is not only omnipotent but all-wise and beneficent. For evolution tends to optimism. Few working biologists are pessimistic. And thus, while science as such is concerned with facts and their relations, we can at the end of this century of scientific effort affirm that it need not be, and is not, opposed to whatever is noble, exalted, hopeful and inspiring in human aspirations, or to the yearnings of the soul for a life beyond the present, for there certainly are, in the facts of the moral and spiritual evolution of our race, intimations of immortality, and suggestions, where absolute proof is naturally wanting, of a divinity that shapes the course of nature.

ALPHEUS S. PACKARD.

BROWN UNIVERSITY.

REPORTS OF COMMITTEES OF THE AMERICAN
ASSOCIATION FOR THE ADVANCEMENT
OF SCIENCE.

SIXTEENTH ANNUAL REPORT OF THE COMMITTEE
ON INDEXING CHEMICAL LITERATURE.

THE Committee on Indexing Chemical Literature respectfully presents to the Chemical Section its sixteenth annual report, covering the twelve months ending August, 1898.

Works Published.

A Bibliography of the Metals of the Platinum Group, Platinum, Palladium, Iridium, Rhodium, Osmium, Ruthenium, 1748-1896. By JAS. LEWIS HOWE. Smithsonian Miscellaneous Collections, 1084. City of Washington, 1897. 8vo. Pp. 318.

This fine volume forms one of the most valuable and comprehensive indexes to an important field of chemical literature produced under the auspices of the Committee since its appointment in 1882. It shows on every page evidence of conscientious and critical skill; the author- and subject-indexes, with which the book concludes, are important features. Its workmanship and the method of presentation of data in type make Dr. Howe's volume a model.

Reference to the Literature of the Sugar-Beet, exclusive of works in foreign languages. By CLARIBEL RUTH BARNETT. U. S. Department of Agriculture. Library Bulletin, June, 1897. 4to. Pp. 9.

This carefully edited contribution to the bibliography of a subject interesting to the chemist as well as to the scientific farmer manifests the activity of the U. S. Department of Agriculture in its Library.

A Chemical Bibliography of Morphine 1875-1896. By H. E. BROWN, under the direction of A. B. PRESCOTT. Completed in Pharmaceutical Archives, Vol. 1, No. 3.

A supplement carries the literature through 1897. The separates contain an index of authors.

A Bibliography of the Metallography of Iron and Steel. By ALBERT LADD COLBY. Published in the *Metallographist*, Vol. 1, No. 2, pp. 168-178. April, 1898.

This includes 188 titles, arranged alphabetically by authors, and numbered chronologically; it is reprinted, extended and re-arranged from *The Iron Age*, January 27, 1898, by the author.

Review and Bibliography of the Metallic Carbides. By J. A. MATHEWS. Smithsonian Miscellaneous Collections, No. 1090. City of Washington, 1898. 8vo. Pp. 32.

Published by the Smithsonian Institution on recommendation of this Committee. Under each metal forming a carbide the author has given a brief synopsis of the chemical data with references to the literature on that subject. There is an author-index.

A Catalogue of Scientific and Technical Periodicals 1665-1895, together with Chronological Tables and a Library Check-List. By HENRY CARRINGTON BOLTON. Second Edition. Smithsonian Miscellaneous Collections, No. 1076. City of Washington, 1897. 8vo. Pp. 1247.

This bibliography was first issued in 1885 and the second edition has been prepared at the request of the Smithsonian Institution. It embraces periodicals in every department of pure and applied science, including, of course, chemistry and chemical technology. The Chronological Tables give the date of publication of each volume of about 550 periodicals; they enable one to ascertain the date of a given volume in a given series of a given work, or to determine the number of a volume when the date only is given. The Library Check-List shows in what American Libraries, 133 in number, complete sets of the periodicals may be found. The second edition brings the date down to 1895; its publication has been delayed by the compilation of the

Check-List. The periodicals catalogued number 8603.

Alkaloidal Estimation: a bibliographical index of chemical research prepared from original literature for the Committee of Revision and Publication of the Pharmacopœia of the United States of America, 1890-1900. By PAUL I. MURRILL, under the direction of ALBERT B. PRESCOTT. Ann Arbor, 1898.

A pamphlet of about sixty pages, not for sale.

The *Review of American Chemical Research*, edited by ARTHUR A. NOYES and published in the Journal of the American Chemical Society, completed Vol. III., in December, 1897. Two indexes, an author- and a subject-index, increase its value

Mr. E. W. Allen, Acting Director of the Office of Experiment Stations, U. S. Department of Agriculture, in reply to inquiries, sends the following communication:

"During the past year we have completed Volume IX. of the Experiment Station Record (1897-'98). This, like former volumes, contains abstracts of and references to articles on the methods and results of work in agricultural chemistry published in this country and in Europe. During the past year the review of Russian scientific periodicals has been added. About 2,000 cards of the Card Index of Experiment Station Literature have been issued during the past year, making a total of 16,000 cards in this index at present. In addition to several accounts of chemical studies of the nutrition of man, the Office has issued a 'Report of preliminary investigations on the metabolism of nitrogen and carbon in the human organism with a respiration calorimeter of special construction,' by W. O. Atwater, C. D. Woods and F. C. Benedict, the work being carried on in part by funds furnished by this Office. In this connection may also be mentioned a compila-

tion of over 400 pages of metabolism experiments in which the balance of income and outgo was determined, made by W. O. Atwater and C. F. Langworthy, and issued from this Office. The bulletin is a digest of about 3,600 experiments with man and animals in which the balance of one or more of the factors of income and outgo was determined. While this work may at first thought seem somewhat afield, it is chemical in its character as well as physiological, and has involved in some cases quite extensive chemical studies."

The 'Digest Metabolism Experiments' herein named forms Bulletin No. 45 of the Office of Experiment Stations, and constitutes a comprehensive bibliography of the subject.

The Committee chronicles the publication of the following bibliographies bearing more or less on chemical researches:

Contributions to the Bibliography of Gold. By A. LIVERSIDGE. Australasian Association for the Advancement of Science. Brisbane, 1895. 8vo. Pp. i+181.

Analyst (The). The organ of the Society of Public Analysts. *General-Index* to the Proceedings of the Society of Public Analysts, Vol. I. (1876), and to the Analyst, Vols. I.-XX. (1877-1896). Compiled by J. CUTHBERT WELCH. London, 1897. 8vo. Pp. i+181.

Arranged on the dictionary plan, authors, subjects and cross-references in a single alphabet.

Bibliographie des travaux scientifiques (sciences mathématiques, physiques et naturelles) publiés par les Sociétés Savantes de la France. Par J. DENIKER. Tome I, part 2. Paris, 1897. 4to.

Part 1 was published in 1895. Most important for original papers published in France.

Biographisch-Literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften. Von

J. C. POGGENDORFF. Dritter Band (die Jahre 1858 bis 1883 umfassend). Herausgegeben von B. W. Feddersen und A. J. von Oettingen. Leipzig, 1897-98. Roy 8vo.

This valuable addition to Poggendorff's well-known biographical dictionary is useful to chemists inasmuch as it gives the titles of original papers by the principal chemists of the world published during the period specified.

Works in preparation and reports of progress.

A *subject- and author-index* to the first twenty volumes of the *Journal of the American Chemical Society* is being compiled by Mr. Sohon, who expects to complete the MS. in December, 1898.

A *First Supplement to the Select Bibliography of Chemistry, 1492-1897*, by Henry Carrington Bolton, is now going through the press. It will form a volume of the Smithsonian Miscellaneous Collections of about 600 pages.

A *Second Supplement* to the same bibliography, to contain chemical dissertations only, is well advanced, about 8,000 titles being already in hand.

Dr. A. C. Langmuir reports the completion of his MS. *Index to the Literature of Zirconium*.

Dr. C. H. Joüet reports the near completion of his *Index to the Literature of Thorium*.

Mr. George Wagner reports progress on a *Bibliography of Oxygen*.

The manuscript of an *Index to the Literature of Thallium, 1861-1896*, by Miss Martha Doan, lately of Cornell University, was submitted to the Committee through Professor L. M. Dennis, and after critical examination it has been unanimously recommended to the Smithsonian Institution for publication.

Dr. Alfred Tuckerman is engaged upon new editions of his *Indexes to the Literature of the Spectroscope*, and of *Thermodynamics*, which are to be continued to the year 1900.

He also reports progress on the *Index to the Mineral Waters of the World*, the printing of which has been delayed by mechanical difficulties.

Dr. Wilhelm P. Jorissen, of Rotterdam, has undertaken to bring down to date Professor Albert R. Leeds' *Indexes to Ozone and to Hydrogen Peroxide*, first issued in 1880, and long since out of print.

Monsieur Jules Garçon, chemical engineer (of 40 bis Rue Fabert, Paris), is about to publish an important contribution to the bibliography of technical chemistry, entitled: 'Répertoire universel de bibliographie des industries tinctoriales et des industries annexes.' It is expected to form three large volumes. In the preparation of this immense undertaking the author has examined 1,800 works and 111 sets of periodicals, the latter in 5,000 volumes, besides 7,000 other articles and documents. Subscriptions (100 francs) may be sent to the publishers, Gauthier-Villars et fils, Paris. M. Garçon is known as the author of the 'Bibliographie de la technologie chimique des fibres textiles,' Paris, 1893, noted in our Thirteenth Annual Report.

Two unfinished manuscript indexes are at the disposal of persons willing to undertake their completion: an *Index to the Literature of Carbonic Oxid*, begun by the late Professor William Ripley Nichols and continued by Professor Augustus H. Gill; and an *Index to the Literature of Milk*, begun by Professor Clement W. Andrews.

As stated in previous reports, this Committee does not attempt to prescribe a fixed plan for volunteer indexers, but leaves method and topic to be chosen by compilers; the Committee does not seek to control the productions further than to insure work of high merit and to guard the interests of the Smithsonian Institution, which has agreed to publish manuscripts endorsed by the Committee. Chemists willing to undertake the compilation of in-

dexes are requested to send their names and addresses with a memorandum of the subject chosen to the Chairman of the Committee (Cosmos Club, Washington, D. C.), who will furnish sample copies of indexes and other information.

H. CARRINGTON BOLTON, *Chairman*,
F. W. CLARKE,
A. R. LEEDS,
A. B. PRESCOTT,
ALFRED TUCKERMAN,
H. W. WILEY, *Committee.*

REPORT OF THE COMMITTEE ON STANDARDS OF MEASUREMENT.

The determination of the mechanical equivalent of heat by the electrical method, as reported by Griffiths (*Phil. Trans.*, A, 1893) and by Schuster and Gannon (*Proc. Roy. Soc.*, Nov., 1894) gave a larger value than Rowland's corrected result. This fact has created a demand for the redetermination of the ampere in terms of the electrochemical equivalent of silver. At the Toronto meeting of the British Association last year a grant was made to the B. A. Committee on Electrical Measurements for the purpose of carrying out this investigation.

At the Detroit meeting of this Association the grant of \$50 previously made for the use of this Committee was made available for the past year. Though this appropriation was clearly insufficient for the purpose, it was decided that the redetermination of the ampere should be undertaken for the committee of this Association in the physical laboratory at Ann Arbor. The work has been ably carried to completion by Professor Patterson and Dr. Guthe. The details of the method will be given in a paper by Dr. Guthe before Section B.*

The discrepancy between Griffiths' results and those of Rowland is about one part in 400 at all temperatures between 15° and 25° on the nitrogen scale. Those of

* This paper was duly presented.—ED. SCIENCE.